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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/082,309	05/20/1998	ANDREAS WALDER	15258-176-1U	2544

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EXAMINER	
STAICOVICI, STEFAN	
ART UNIT	**PAPER NUMBER**
1732	29

DATE MAILED: 10/23/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/082,309	WALDER, ANDREAS	
	Examiner	Art Unit	
	Stefan Staicovici	1732	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 August 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *30-33* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *30-33* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114 was filed in this application after a decision by the Board of Patent Appeals and Interferences, but before the filing of a Notice of Appeal to the Court of Appeals for the Federal Circuit or the commencement of a civil action. Since this application is eligible for continued examination under 37 CFR 1.114 and the fee set forth in 37 CFR 1.17(e) has been timely paid, the appeal has been withdrawn pursuant to 37 CFR 1.114 and prosecution in this application has been reopened pursuant to 37 CFR 1.114. Applicant's submission filed on August 29, 2003 (Paper No. 27) has been entered.

Response to Amendment

2. Applicant's amendment filed August 29, 2003 (Paper No. 28) has been entered. Claims 1-29 have been canceled. New claims 30-33 have been added. Claims 30-33 are pending in the instant application.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claim 30 is rejected under 35 U.S.C. 103(a) as being unpatentable over Buckner (US Patent No. 3,751,377) in view of Klingebiel (US Patent No. 3,941,529) and in further view of Muirhead et al. (US Patent No. 3,372,215).

Buckner ('377) teaches the basic claimed process including, providing a source of molten resin (31), a source of volatile fluid foaming (blowing) agent (37) partially soluble in said molten resin and a plurality of interfacial surface generators (32, 33, 34) (static mixers) (see col. 2, lines 44-46). As shown in Figure 2, the source of molten resin, extruder (31) is in operative communication with interfacial surface generator (32) (static mixer) which provides admixing of the blowing agent with the heat plastified polymer to form a gel, hence avoiding segregation (dispensing of the blowing agent and the retaining of the mixture). It should be noted that because the volatile fluid foaming (blowing) agent may be added directly to the polymer source at the entry to the first interfacial surface generator (32) or may be added within the interfacial surface generator (see col. 4, lines 67-70), it is submitted that the gel mixture of molten resin and blowing agent is acted upon by a plurality of interfacial surface generators (32, 33, 34). Further, Buckner ('377) teaches in Figure 2 teaches that the process line further includes processing unit (33) for retention of the heat plastified mixture at a predetermined temperature and pressure and, processing unit (34) to remove heat (cooling) from the heat plastified mixture, hence bringing the material to a desired (predetermined) temperature prior to discharge from the die (35).

Regarding claim 30, Buckner ('377) does not teach intensive shearing in a first static mixer during said dispensing step and a lower shearing in a second static mixer during said retaining step. Klingebiel ('529) teaches a mixing process of a blowing agent and a molten

thermoplastic resin stream for molding a thermoplastic foam including, an intensive shearing portion followed by a lower shearing portion. Further, Klingebiel ('529) teaches intense shearing during dispensing of the blowing agent in the molten thermoplastic resin stream (zones I-IV) in order to disperse said blowing agent throughout said molten thermoplastic (first mixer). Furthermore, Klingebiel ('529) teaches a lower shearing in order to randomize said dispersion throughout said molten thermoplastic melt (zones V-VI) (second mixer) (see col. 3, line 34 through col. 4, line 2). It is submitted that in a mixing process of a thermoplastic polymer with a blowing agent, application of a high shear results in a higher temperature, hence a lower viscosity, which in turn permits a more intense mixing of said blowing agent with said thermoplastic polymer. Further, it is submitted that in a mixing process of a thermoplastic polymer with a blowing agent a lower shear results in a lower temperature, hence allowing the material to be retained at a predetermined temperature and pressure and also, allows for said dispersion to be randomly dispersed throughout molten thermoplastic melt. Furthermore, it should be noted that Buckner ('377) specifically teaches that the selection of the size of a static mixer to achieve desired polymer processing parameters is "within the skill of the average designer" (see col. 4, lines 33-36). Therefore, it would have been obvious for one of ordinary skill in the art to have provided intense shearing during dispensing of the blowing agent in the molten thermoplastic resin stream (first static mixer) and a lower shear during retention of said mixture (second static mixer) as taught by Klingebiel ('529) in the process of Buckner ('377) because, Klingebiel ('529) specifically teaches that such shear control provides for a uniform dispersion of the blowing agent that results in a uniform cell structure of controllable size, hence

obtaining an improved molded product (see col. 1, lines 31-36) and also because, both references teach similar materials and end-products.

Further regarding claim 30, although Buckner ('377) teaches a thermoplastic foam and a die, Buckner ('377) in view of Klingebiel ('529) does not teach granulating the cooled mixture. Muirhead *et al.* ('215) teach a process of forming expandable thermoplastic particles by extruding a heat plastified polymeric composition containing an expanding (blowing) agent in filamentary form, immediately cooling the extruded polymer and cutting the extruded and cooled polymer into particles (granules). It would have been obvious for one of ordinary skill in the art at the time of the invention to replace the die (35) in the process of Buckner ('377) in view of Klingebiel ('529) with the die head (13), cooling bath (19) and cutter (20) of Muirhead *et al.* ('215) in order to form granulate material because, Muirhead *et al.* ('215) specifically teaches that such granulate can be obtained from extruding a thermoplastic foam material and as such improves process versatility and also because, both references teach similar materials.

Furthermore, it should be noted that a static mixer inherently has a retention time that varies according to its size, hence the static mixer performs both mixing and retaining functions. Also, it should be note that since the volatile fluid foaming (blowing) agent may be added within the interfacial surface generator (32) (see col. 4, lines 67-70), and that a static mixer inherently has a retention time, then it is submitted that the dispensing of the blowing agent and the retaining of the mixture is carried out in a single apparatus, specifically interfacial surface generator (32).

5. Claims 31-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Buckner (US Patent No. 3,751,377) in view of Klingebiel (US Patent No. 3,941,529) and in further view of Muirhead et al. (US Patent No. 3,372,215) and Cha *et al.* (US Patent No. 5,158,986).

Buckner ('377) in view of Klingebiel ('529) and in further view of Muirhead *et al.* ('215) teaches the basic claimed process as described above.

Regarding claims 31-33, Buckner ('377) in view of Klingebiel ('529) and in further view of Muirhead *et al.* ('215) do not teach the relationship between the level of shearing and, the cross-sectional area of the static mixer and the flow rate of a thermoplastic/blowing agent mixture as said mixture travels through said cross-sectional area of said static mixer. However, the relationship between the level of shearing and, the cross-sectional area of the static mixer and the flow rate of a thermoplastic/blowing agent mixture as said mixture travels through said cross-sectional area of said static mixer is well known in the art as evidenced by Cha *et al.* ('986) which teach that if the diameter of the static mixer, hence the cross-sectional area, is large, then the flow rate of the polymer material therethrough is small and the resulting shear is low (see col. 11, lines 3-19). In view of the teachings of Cha *et al.* ('986), it is submitted that if the diameter of the static mixer, hence the cross-sectional area, is small, then the flow rate of the polymer material therethrough is large and the resulting shear is high. Therefore, in view of the teachings of Cha *et al.* ('986), it is submitted that a small cross-sectional area of the mixer results in a high flow rate and high shearing of said thermoplastic/blowing agent mixture, hence forming the physical functioning principle of the first static mixer. Further, it is submitted that a large cross-sectional area of the mixer results in a low flow rate and low shearing of said

thermoplastic/blowing agent mixture, hence forming the physical functioning principle of the second static mixer. Therefore, it would have been obvious for one of ordinary skill in the art to have provided the relationship between the level of shearing and, the cross-sectional area of the static mixer and the flow rate of a thermoplastic/blowing agent mixture as said mixture travels through said cross-sectional area of said static mixer as taught by Cha *et al.* ('986) (small cross-sectional area and high flow rate result in high shear, whereas a large cross-sectional area and a low flow rate result in low shear) in the process of Buckner ('377) in view of Klingebiel ('529) and in further view of Muirhead *et al.* ('215) because, Klingebiel ('529) specifically teaches that such shear control provides for a uniform dispersion of the blowing agent that results in a uniform cell structure of controllable size, hence obtaining an improved molded product (see col. 1, lines 31-36), Cha *et al.* ('986) specifically teach that such control of the shearing is determined by the cross-sectional area and flow rate of said thermoplastic/blowing agent mixture and also because, all references teach similar materials.

Response to Arguments

6. Applicant's arguments filed August 29, 2003 (Paper No. 28) have been considered.

Applicant's arguments are drawn to a newly presented claim limitation not previously presented and has been rejected in this Office Action as set forth above.

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stefan Staicovici, Ph.D. whose telephone number is (703) 305-0396. The examiner can normally be reached on Monday-Friday 8:00 AM to 5:30 PM and alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael P. Colaianni, can be reached at (703) 305-5493. The fax phone number for this Group is (703) 305-7718.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-0661.

Stefan Staicovici, PhD

Primary Examiner 10/17/03

AU 1732

October 17, 2003